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PISCES

COMPILED BY

G. PALMER (Recent) and
E. I. WHITE, D.Sc., F.R.S. (Fossil)

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15. PISCES

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I.—TITLES.

The year of publication of a title is omitted from the reference where it is the same as the volume year of the 'Record' namely 1958.

Direction 87. Completion and, in part, correction of the entries on the *Official List of Generic Names in Zoology* in regard to the generic names *Cottus* Linnaeus, 1758, and *Conger* Oken, 1817 (Class Pisces) made by the rulings given respectively in *Opinions* 77 and 93 published in the period up to the end of 1936 and matters incidental thereto. *Opin. int. Comm. zool. Nom. 1F* : 1-16.

Opinion 513. Determination of the species to be accepted respectively as the type species of the genera *Culter* and *Nasus* both of Basilewsky, 1855. *Opin. int. Comm. zool. Nom. 18* : 291-302.

Resolution supplementary to **Opinion 485.**

On the subject of the relative priority to be assigned to the names *Cheirodon axelrodi* Schultz (L.P.) and *Hypessobrycon cardinalis* Myers (G.S.) & Weitzman (S. H.) (Class Pisces), both names being published in February, 1956. *Opin. int. Comm. zool. Nom. 17* (23) : 104A-104J.

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II.—SUBJECT INDEX

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Text-books.—**Berg** (2); general zoology, **Guthrie & Anderson**; **Grassé & others**; Marine ecology, **Moore, H. B.**; morphological integration with particular regard to palaeozoology, **Olson & Miller**; origin, anatomy and function of the vertebrate visual system, **Polyak**.

Popular books.—Fishes for a marine aquarium, **Simkatis**.

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General.—Of *Carcharhinus melanopterus*, Melouk; *Stenodus* and *Coregonus*, Smolyanov; of carp, Starmach; Zarnecki & Czubak; *Esox*, Gehr; Forsyth; *Heterotis*, Daget (1); *Mugil*, Anderson (1); Nair (2); *Gasterosteus*, Swarup (4); *Cynoglossus lingua*, Kuthalingam; developmental stages of fish, particularly *Cyprinus*, Balon (8); growth of body surface and respiratory surface of gills in *Carassius* and *Cyprinus*, Solewski (4); early development of *Antennarius*, Padmanabhan; *Barbatula*, Kobayashi & Moriyana; *Ctenopharyngodon* and *Hoplophthalmichthys*, Inaba & others (1); *Girella Mito*; *Notropis* and *Campostoma*, Reid; *Periophthalmus*, Kimura; *Petromyzon*, Bahr; *Sardina*, Oliver; *Seriola*, Uchida & others; *Tridentiger*, Dötu (2); *Wallagonia*, Mazumdar, S. R. (2); technique of embryological study, Gehr.

Eggs.—Of *Lampetra*, Chubareva (1); *Salmo*, Devillers & Rajchman; *Cymopoeius* and *Pterolebias*, Siegel; *Ambassis*, Nair (1); *Chromis*, Fujita (1); *Sebastes oblongus*, Fujita (3); *Antennarius* and *Histrio*, Rasquin (3); position of nucleus in *Lebistes* egg, Clavert & Filogamo (1); rotation of egg of *Lebistes*, Clavert & Filogamo (2); oocyte of *Liopsetta*, Yamamoto, K. (1); early segmentation in *Petromyzon* eggs, Veit; effect of low oxygen levels on *Oncorhynchus* eggs, Alderdice & others; effect of CO₂ on *Oncorhynchus* eggs, Alderdice & Wickett; effect of Zn ions on *Salmo* eggs, Yamamoto, T. S. (2); formation of gelatinous membrane, Ivanov, M. F.

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Larvae and young.—Of *Lampetra*, Balon (5); of *Acipenser*, Semenov; Dragomirov; *Hucho*, Balon (2); *Blicca*, Frank (2); *Cyprinus*, Balon (6); *Mormyrus*, Daget (5); *Esox*, Čihář (2); *Ambassis*,

Nair (1); *Anoplopoma*, Kobayashi, K. (1); *Chromis*, Fujita (1); *Caranx cryos*, McKenney & others; *Katsuwonus*, Ishiyama & Okada; *Mugil cephalus*, Anderson (3); *Sebastes*, Fujita (2); Cottidae and Comephoridae, Taliev; ventral adhesive papillae in *Neolebias*, Schapitz (3).

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Hildemann; regeneration of *Ameiurus*; taste barbel, Goss; Kamrin & Singer; experiments on internal organs of *Cyprinus*, Wunder (1).

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Effects of chemicals etc.—Effects of CO₂ and urethane on *Scylloarinus*, Corabœuf & Gargouil; toxicity of DDT to *Salmo*, Gagnon; effects of DDT, Corbet (2); effect of insecticide on *Carassius* and *Oryzias*, Matsue & others; effects of chlordane on Cyprinids, Ananiades; effect of ergot drug on *Betta*, Evans & others (2); poisonous effects of sodium nitrite, Klingler; effects of heavy metal salts, Schweiger; effect of chlorinated hydrocarbons on fishes, Webbe; effect of dieldrin, Harrington & Bidlingmayer; effect of temperature on toxicity of dipicrylamine, Tammes.

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Differences between the sexes.—Sexual dimorphism in *Barbus curmuca*, Raj; *Synodontis*, Pinter (3); *Pachypanchax*, Nieuwenhuizen (2); *Steatocranus*, Wickler (4); *Gomphosus*, Strasburg & Hiatt; Scarids, Winn & Bardach; *Clinostomus*, Schwartz & Norvell; sex determination in *Tilapia*, Mathieu; false gonochorism in *Coris*, Bacci & Razzauti (1).

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Hormones and sex.—Mammalian hormones as ovulating agents in *Heteropneustes*, Ramaswami & Lakshman; induced spawning in *Heteropneustes* following hormone injection, Ramaswami & Sundararaj (1) & (2); hormone induced gonopodial structure in ♀ *Lebistes*, Ishii; masculinisation of female gonads of *Lebistes* by hormone injection, Mohsen (3); (4); appearance of male character in female *Oryzias* following hormone treatment, Egami (1); changes in gonadal state of *Oryzias* following hormone administration, Egami (5); production of testis-ova in male *Oryzias*, Egami (2) & (3); induced sex reversal in *Oryzias*, Yamamoto, T. S. (1) & (4); acceleration of spawning in *Misgurnus* by hormone injection, Kobayashi & Yamabayashi; changes in *Bathygobius* following pituitary implantation, Stoll.

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Parental care.—In *Galeichthys*, Atz (4); *Hemichromis*, Spatz; *Apistogramma* and

Nannacara, Butz & Kuenzer; oral incubation in *Geophagus*, Reid, M. J. & Atz; starving of parent while brooding in *Haplochromis*, Kibbat; evidence of special skin secretion on which young feed in *Sympphysodon*, Weingarten; male *Tetraodon* guarding and fanning eggs, Geiser; use of mouth by male, Kuenzer (2).

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Evolution.—Trends in teleost evolution, Myers (1); transformation from protractile mouth to tubular snout, Le Danois; transition of afferent branchial arteries from fish to amphibian, Das & Saxena.

Hybrids.—Fertility of *Coregonus* hybrids, Gasowska; sterility and inviability of Cobitid hybrids, Minamori (2); intergeneric hybrids in Cobitidae, Kobayashi, H. (1); *Abramis brama darmbii* × *Rutilus rutilus* hybrid, Pavlov; hybrids of species of *Labeo* and *Cirrhina*, Husain; natural hybrids between *Esox* spp., Raney (3); between *Perca* and *Lucioperca*, Balon (3); hybridization amongst different species, Nikolyukin; histological study on *Platichthys* × *Parophrys* hybrids, Aron; fertility of F₁ hybrids, Hubbs, Clark (1); relation of duration of sperm function to hybridization, Hubbs, Clark & Drewry.

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Chromosome studies.—Sex determining chromosomes in *Cottus*, Nogusa (1); studies on Gobiid fishes, Nogusa (2).

Raciation and speciation.—Of Baikal Cottidae and Comephoridae, Taliev; Acipenseridae, Gerbilskii (1); Pickford; racial studies on some Rumanian freshwater fishes, Banarescu (4); races of *Clupea*, Tambovtzev; characterisation of populations and definition of races in *Clupea*, Wielinga; biological differentiation in species limits, Gerbilskii (3); problems of speciation, Sarà; species problem in *Coregonus*, Brooks; heterosis and reproductive isolation, Spurway (2).

Albinism, ambicoloration etc.—Albinism in *Arius*, Gupta & Bhownick; *Oncorhynchus*, Hikita (2); albinism and ambicoloration in *Paralichthys*, McKeever; ambicolorate *Paralichthys*, Deubler & Fahy; *Platichthys*, Ghirardelli; an orange-coloured *Lepisosteus*, Phillips, C.; golden form of *Nemachilus*, Frank (4); colour varieties of *Misgurnus*, Kobayashi, H. (2); melanism in hybrid *Xiphophorus* × *Mollienisia*, Elwin.

Biometric studies.—On young *Megalops*, Harrington (2); *Brevoortia*, June; *Cetengraulis*, Berdegué (2); *Sardina*, Matta (2) & (3); *Mallotus*, Pitt (1); *Cyprinus*, Mišik (3); *Cobitis*, Mišik (2); *Aphanius*, Lozano Cabo (2); *Spicara*, Dieuzeide & Roland (3); *Thunnus*, Doumenge & Lahaye; *Neothunnus*, Kurogane & Hiyama (1); *Nakagome* (1); Central Pacific Istiophoridae, Royce; Moroccan Scorpaenids, Boutière; *Trigla*, Monteiro (1); *Anoplopoma*, Phillips & others; variation of gill raker count in *Alosa*, Furnestin & Vincent; vertebral counts on some Spanish fishes, Larrañeta (2).

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Franca, P. da & M. de L. (1); *Hippocampus zosterae*, Strawn; *Tilapia nilotica*, Lowe (2); *Thunnus*, Akyüz & Artüz; *Orcynopsis*, Postel (1); some tropical E. Atlantic scombrids, Postel (3); *Ctenogobius*, Dötu (3); *Luciogobius*, Dötu & Mito; *Paleatogobius*, Dötu (1); *Sicyopterus*, Manacop; *Tridentiger*, Dötu (2); Moroccan *Scorpaena*, Boutière; Baikal Cottidae and Comephoridae, Taliev; *Limanda*, Bohl; some Moravian fishes, Hochman.

Age and growth.—Of *Sardina*, Larrañeta & Lopez; *Chondrostoma*, Banarescu & others; *Dorosoma*, Berry (4); *Pomolobus*, Graham, J. J.; *Osmerus*, McKenzie; *Salmo lacustris*, Merlo (1); *Vistula Salmo*, Zarnecki (3); river Lee *Salmo*, Newman; *Salvelinus*, Desmarais; marked *Salvelinus*, Cable; *Coregonus* in Arendsee, Bauch (1); *Mallotus*, Pitt (2); *Esox* from Saskatchewan, Schultz, F. H.; *Cyprinus*, Schöffman (1); *Cyprinus* in Roumania, Papadopol (1); *Reporhamphus*, Ling; *Gadus* in Karsk Sea, Pokrovskaya (1); *Perca*, Frank (3); *Lepomis*, Costanzo; *Lucioperca*, Biely (2); *Stizostedion*, Hassler (1); *Morone*, Schöffman (2); *Micropogon*, Suttkus (1); *Tilapia* spp. and *Lates*, Jensen; *Gobius minutus*, Swedmark; Turkish *Mugil*, Denizci; *Sebastes*, Sandeman; *Anoplopoma*, Phillips & others; Southern Baltic *Pleuronectes*, Molander; Soleoid fishes, Ochiai (1); Balaton Lake fishes, Entz & Lukacsóvics; age and size of Manx *Clupea*, Bowers; *Pilodictis*, Cross & Hastings; growth increase of *Salmo* after flooding, Campbell; growth of *Salmo trutta*, Stinson; *Salmo* in Lough Glore, Healy & Kennedy; relation between phytoplankton photosynthesis and growth of *Oncohynchus nerka*, Nelson; growth of *Cyprinus*, Necrasov & others (2); Zarnecki (1); *Cyprinus* in natural and artificial waters, Necrasov & others (3); carp from differently managed ponds, Czubak & Zarnecki; *Abramis* in Danube delta, Papadopol (2); *Rutilus*, Balon (1); *Scardinius*, Cihar & Frank; *Clinostomus*, Schwartz & Norvell; *Anguilla* in IJsselmeer, Deelder (1); *Merluccius*, Matta (1) & (4); *Melanogramma aeglefinus*, Wise (1); *Lota*, Müller. W.; *Perca*, Le Cren (1); *Vimba* and *Chalcalburnus*, Kasumov; *Chrysophrys*, Longhurst (2); *Mullus*, Bougis & Muzinic; *Centronotus*, Qasim (2); young *Mugil cephalus*, Anderson (3);

Mugil curema, Anderson (1); Scorpaeidae of Morocco, Boutière; *Pleurogrammus*, Kyushin; fish in Kozlawa Góra reservoir, Poland, Dyszewska & Markiewicz; some marine fishes in aquaria, Hirosaki & others; differences in rate of growth of Caspian, Black and Azov sea clupeoids, Svetovidov (2); age composition of *Sardinops* in commercial catches, Davies (2); growth rhythm of *Chondrostoma*, Stefan, G.; comparison of specific with average growth of *Salmo*, Kodama; seasonal variation in growth rate of *Salmo*, Swift; large *Salmo* in Iceland, Gudjonsson; factors influencing size of year class of *Gadus*, Wiborg; average weight of Portuguese *Sardina*, Oliveira & Pinto; length-weight relationship in *Esox*, Čihář (1); weight/length data on *Chrysophrys*, Cassie; weight/length relationship of some Indian fishes, Moitra (1); effect of light on early growth in *Oncorhynchus*, Eisler (1); growth of *Sardina* related to temperature, Muzinic (1); effect of temperature on growth of *Gadus*, Taylor (2); effect of diet on growth of *Ictalurus*, Gray; allometry in early development of *Esox*, Gihr; adaptive significance of growth rate, Vasnetsov; relative weights of internal organs during growth, Lühmann & Mann; annual fishes, Carvalho, A. L. de (1); longevity of *Scardinius* in thermal pond, Müller, G. J.

Fish marking experiments.—In Quebec waters, Vladkyov; on some Brazilian freshwater fishes, Godoy; results of *Clupea* tagging in Bay of Fundy, McKenzie & Tibbs; in British Columbia, Taylor, F. H. C. & others; tagging experiments on *Oncorhynchus*, Milne; survival and spawning of marked *Oncorhynchus*, Nelson & Abegglen; growth of tagged and untagged *Salvelinus*, Smith, M. W. (1); southern range of marked *Gadus*, Wise (2); tagging experiments on *Gadus* off Nova Scotia, McCracken (1); in Barents Sea, Trout (2); on *Anoplopoma*, Phillips & others; an inexpensive fish tag, O'Rourke & Makings; use of Lea's hydrostatic tag, Smith, M. W. (2); use of fin clipping, Stuart (2).

Scale reading etc.—Svardson (1); on *Oncorhynchus*, Hayashi; use of otoliths in *Clupea* racial studies, Bückmann & others; use of otoliths for age determination of *Sardinops*, Mosher;

validity of *Melanogrammus* otolith age determinations, Kohler; *Melanogrammus* otolith—scale comparisons, Kohler & Clark; otolith size/total length relationship in *Astroconger*, Okada & Suzuki (3); interpretation of *Sebastes* otoliths, Bratberg; annual rings on *Clupea* scales, Muzinic & Richardson; use of scales for age determination in *Engraulis*, Hayashi & Kondo; estimation of growth from *Salmo* scales, Hartley (1); collection and interpretation of *Oncorhynchus* scales, Clutter & Whitesel; validity of age determination from scales of *Salvelinus*, Cable; use of *Rutilus* scales for age determination, Balon (1); rings in *Tilapia* scales associated with calcium deficiency at breeding time, Garrod & Newell; growth checks in *Rastrelliger* scales, Sesappa; interpretation of *Aldrichetta* scales, Thomson (2).

Population studies.—Characters used in *Hilsa* study, Pillay (1); stock strength of Atlanto-Scandian *Clupea*, Aasen; studies on *Clupea*, Bückmann & others; Houston; Rasmussen; Wielinga; *Alosa nordmanni*, Zalevsky; *Plecoglossus*, Kawanabe & others (1) & (2); *Salmo trutta*, Le Cren (2); *Oncorhynchus nerka*, Kubo, T. *Abramis ballerus*, Yurovitsky; *Rutilus* in Poland, Stangenbergh; *Gadus*, Jonsson; Otterbech; Portuguese *Gambusia*, Franca, P. da & M. de L. (1); *Eupomotis*, Marchetti; *Roccus*, Raney (2); Raney & Woolcott; Raney & others; *Scomber*, Nedelec; Germe, Kurogane & Hiyama (4); *Anoplopoma*, Phillips, J. B. (2); spawning stocks of *Salmo* of a Newfoundland river, Murray; spawning population of *Cyprinus*, Balon (4); geographic variation in *Fundulus notti*, Brown; population studies off Texas coast, Gunter (2); effect of predators on size of a population, Fortunatova.

Fluctuations of stock.—Uda; of *Sardinops* off Kii Peninsula, Zinziro; of E. Anglian *Clupea*, Hodgson; seasonal fluctuations of *Salmo* in Baltic, Alm; cyclic fluctuations of *Oncorhynchus* in Alaska, Rounsefell (2); fluctuations in Grand Lakes, Vladkyov & Beaulieu; factors affecting fluctuations in Port Aransas, Springer & Pirson.

Ecological studies.—On minnows in an intermittent stream, Paloumpis (1); on *Acanthocybium*, Iversen & Yoshida; on pelagic fishes of Black Sea, Forum

I. I. & F. I.; on fauna of Elbe, Bauch (3); on Bosna river, Yugoslavia, Oskar; on a high altitude Sierra Nevada lake, Reimers (2); on Heming Lake, Manitoba, Lawler & Watson; on Inhaca Island, Kalk.

Ecological surveys.—Population of an Illinois stream, Lewis, W. M.; of Deep Creek, Kansas, Minckley; of N.S.W. trout waters, Lake; marine ecology-general text book, Moore, H. B.

Relations with physical environment.—Resistance of young *Oncorhynchus* to low temperatures, Brett & Alderdice (2); conditions favourable to tuna, Lozano Cabo (1); 'critical period' in early life history of marine fishes, Marr; effects of environmental stress on fishes, Brett (2); influence on fish behaviour, Fleming; preferred temperatures of some lake fishes, Ferguson; effects of drought on populations, Paloumpis (3); importance of various factors in a sewage effluent and their balance, Allan & others; fishes of acid, calcareous and torrential waters in Malaya, Johnson; phenological studies on fish, Ristkok (2).

Special habitats.—Survey of N. American cave fishes, Dearolf; thermal waters harbouring Miocene relicts, ecology of endemic *Scardinius*, Müller, G. J.; habitat of *Caecobarbus*, Heuts & Leleup; onset of air-breathing in young Anabantidae, Stolzenhain; amphibious habits of *Synbranchus*, Lüling (4); habitat of *Uegitglanis*, Thines (2).

Introduction and acclimatization.—Condition of introduced *Coregonus* in North Finland, Järvi; introduction of *Carassius*, *Trichogaster* and *Tilapia* into East Pakistan, Ahmad (3); introduction of *Lucioperca* into British waters, Mansfield; *Tilapia mossambica*, Atz (1); *T. zillii*, Atz (3); introduced fishes of Thunder Bay, Allin; changes in *Gambusia* acclimatized in Uzbekistan, Gogol; acclimatization of *Huro* in Brazil, Azevedo; acclimatization of fishes in Russia, Shkorbatov; Skrobov.

Hibernation and aestivation.—Encystment of *Protopterus*, Marlier (1).

Food and feeding habits.—Of Senegalese *Eusechichthys*, Cadenat (2); some Central Pacific selachians, Strasburg (2); *Salvelinus*, Desmarais; *Leucichthys*, Ber-samin; *Scardinius*, Čihář & Frank;

Carassius in Central Bohemia, Čihář (3); *Rutilus*, Hruška; species of *Puntius*, *Callichrous* and *Glossogobius*, Moitra (2); *Rutilus* and *Chondrostoma* in Polish waters, Paschalski; *Clupisoma* and *Eutropiichthys*, Motwani & Karamchandani; *Aristichthys* and *Hypophthalmichthys*, Nie & Chiang; *Anguilla*, Godfrey (1); Kublickas; *Betta* in Malaya, Alfred; *Gadus* in Eastern Murman, Zhabreva; *Zeus* in aquaria, Wilson; *Vimba*, Munteanu; *Steatocranus*, Wickler (4); *Seriola*, Hatanaka & others (2); Mitani (1); *Scomber*, Nalbandoglu; Scombrids, Ronquillo; Moroccan Scorpaenids, Boutière; *Synbranchus*, Lüling (4); freshwater Madras fishes, Menon & Chacko (1) & (2); feeding habits of young *Ctenopharyngodon* and *Hypophthalmichthys*, Inaba & Nomura; *Mormyrus kannume*, Macdonald; *Mugil* in Turkish waters, Denizci; *Cynoglossus lingua*, Kuthalingam; some Louisiana fishes, Darnell; fishes in Dzhezkazgansk reservoir, Malinorskaya; some larval fishes, Sato, R.; factors affecting feeding behaviour of *Clupea*, Blaxter & Holliday (2); diurnal rhythm of feeding of *Carassius*, Hirata; Hirata & Kobayashi; feeding coefficient of *Lucioperca*, Biely (1); spitting behaviour of *Toxotes*, Lüling (5); adaptability when deprived of usual food, Corbet (1); relation between mouth size and food size in *Salmo*, Hartman; swallowing of food by *Esox*, Kuzmenko; food of *Squalus*, Ionescu & Serpoianu; young *Clupea*, Matveeva, R. P.; Ethmalosa, Bainbridge, V.; *Salmo trutta*, Stinson; *Dallia*, Nardone; *Clinostomus*, Schwartz & Norvell; *Chondrostoma nasus* in Czechoslovakia, Vejmola; *Scardinius racovitzai*, Müller, G. T.; *Ameiurus*, Frank (1); *Vimba* and *Chalcalburnus*, Kasumov; *Esox*, Čihář (1); *Gadus*, Powles; *Acanthocybium solandri*, Iversen & Yoshida; young *Pneumatophorus*, Hatanaka & others (1); *Makaira*, Krumholz & DeSylva; *Centronotus*, Qasim (2); Nile fishes, Sandon & Tayib; some W. African estuarine fishes, Longhurst (1); stomach contents of *Cetorhinus*, Loas; *Clupea* feeding on *Calanus*, Gerasimov; *Salmo* feeding on *Belone*, Eaton; cannibalism in *Gambusia*, Abdullayev; *Tetraodon* biting fins of other fishes, Ostermöller (1); utilization of *Dorosoma* by game fishes, Kutkuhn; micro-organisms as food of young fish, Assman (2); fishes as predators of

birds, Pitman; feeding on gastropods by removing from shell, Lüling (1); fishes feeding on Cirripedia, Tarasov; feeding on ectoparasites of other fishes, Randall (3); utilization of plankton, Hiyama & Yasuda; Yasuda & Hiyama; algal feeding, Martin, M. & Winks.

Migrations and movements.—Of *Salmo trutta*, Stuart (2); Bear Island *Gadus*, Trout (1); *Micropogon*, Suttkus (1); *Scomber*, Demir & Acara; *Germo* in northwest Pacific, Inoue; *Sarda*, Demir; *Sarda* related to temperature, Acara (2); *Thunnus thynnus*, Smith, F. G. W.; some Turkish Scombrids, Nümann; polarization of light as possible factor controlling movements and migrations, Waterman; Waterman & Westell; migrations of *Alosa*, Talbot & Sykes; Passamaquoddy *Clupea*, McKenzie & Skud; long distance migration of *Salmo*, Menzies & Shearer; feeding migrations of *Thysites*, Blackburn; spawning migrations of Fraser river *Oncorhynchus*, Killick; Krykhtin; Skud; factors affecting seaward migration of *Oncorhynchus*, Kobayashi, T.; seaward breeding migration of *Mugil*, Jhingran; spawning migration of *Pelecus*, Kaj (1); *Vimba*, Zhukovski; *Gasterosteus*, Baggerman; factors affecting migration in Danube, Bacesco & Dumitresco; perception of pathways during migration, Hasler; return to release point of *Oncorhynchus*, Donaldson & Allen; homing behaviour of *Clinocottus* and *Girella*, Williams, G. C.; *Clupea* movements in relation to tidal currents, Jones, F. R. H.; movement of *Salmo* on river Erne, Jackson, P. A.; *Salmo* around Ireland, Went (2); *Salmo* in the Tweed, Nall; tagged *Salmo*, Pyefinch & Shearer; *Salvelinus* in fresh and salt water, Smith H. W. & Saunders; *Anguilla* movements in North Sea, Lühmann & Mann (2); *Anguilla japonica* in Fukue Bay, Japan, Kasahara; *Eopsetta*, Alverson & Chatwin; effect of wind and current on movements of larval *Gadus*, Hill & Lee; movements of tagged examples, Shearer; Estuarine fish invading the Albert River, Australia, Thomson (4); vertical movements of *Engraulis japonicus*, Inoue & Ogura (1); rapid learning of a constant course, Hoar (2).

Behaviour.—Of *Mustelus* and *Torpedo* under influence of histamine and

antihistamine, Jullien & others; evolution of migratory habits in young *Oncorhynchus*, Hoar (3); behaviour of *Xiphophorus*, Wickler (2); behaviour patterns of some Cichlids, Oehlert.

Social behaviour.—Of *Gobius*, Bopp; territorial and spawning behaviour of *Blennius*, Wickler (3); territorial behaviour in *Tetraodon*, Lüling (1); territorial behaviour in an aquarium, Barrow; schooling behaviour of a restricted age-group in *Synodontis*, Pinter (3); schooling habits of *Pomolobus*, Graham, J. F. G.; *Neothunnus* and *Katsuwonus*, Orange & others; jumping of *Engraulis* shoals, Inoue & Ogura (2); competition between young *Salmo salar* and *S. trutta*, Kalleberg; effect of ergot drugs on *Betta*, Evans & others (1); threat display in *Tetraodon*, Lüling (1); colour change related to dominance in *Stephanolepis*, Okaichi & others.

Relations with other organisms.—Martino & Karapetkova; with corals Klausewitz (4); larval fishes found with floating algae, Uchida & Shojima; Labrids feeding on ectoparasites of other fishes, Randall (3); symbiosis of *Amphiprion* with *Stoichactis*, Davenport & Norris; *Cryptocentrus* and the crayfish *Alpheus*, Luther; *Obtortiophagus* and a prawn, Smith, J. L. B. (19); behaviour of *Carapus* towards holothurian host, Arnold.

Cryptic and Mimetic Colouration.—Disruptive colour in *Plectorrhynchus*, Atz (2); mimetism and ecology in Scorpaeidae, Boutière; Müllerian mimicry in *Sufflamen* and *Acanthurus*, Toronese (3).

Ecdysis.—in Japanese fishes, Hirosaki.

Methods of defence and offence.—Sound production by *Botia* as defence weapon, Klausewitz (6); spines of *Gasterosteus* as means of defence, Hoogland & others.

Enemies.—The squid, *Dosidiscus*, feeding on *Engraulis* and *Merluccius*, Buen (1); Grackles (*Quiscalus*) feeding on *Notropis*, Follett (1).

Diseases and parasites.—Fish diseases, Lyaiman; Petmoshevski; fish diseases in Soviet Union and their control, Bauer, O.; new methods of control, Bauer & Uspenskaya; study of ichthyophthirius, Bauer, O. N. (2); study of infectious dropsy, Dinu; Polish method of

fighting dropsy, Kocylowski; clinical study of hydropsy, Nicolau & others; effect of tympanitis on internal organs, Wunder (4); a bacterium causing tail rot, Oppenheimer, C. H.; revised treatment of furunculosis, Snieszko & Bullock; air bubble disease of *Salmo*, Rukavina & Varenika; bacterial disease of *Salmo*, Hoshina (1) & (2); cause of vibrio-disease in *Salmo*, Hoshina (3); control of vibrio disease in *Salmo* Hoshina & others; virus disease in *Salmo*, Deufel; streptococcal disease of *Salmo*, Hoshina & others; gill blight in *Coregonus albula*, Huculak; fungi disease of *Anguilla*, Hoshina & Ookubo; effects of *Saprolegnia* attack on *Gambusia*, Remotti; effect of heavy parasitization on activity, Silliman; parasites of fishes of Greifswald area, Engelbrecht; effect of *Petromyzon* on host fish, Parker & Lennon; parasites of *Clupea*, Dollfus (2); heavy infestation of *Clupea* by a Copepod, Harding & Wheeler; parasites of *Sardina* and *Engraulis*, Reichenbach-Klinke (2); parasitising of *Sardina* by *Peroderra*, Larrafeta (1); fatal infestation of *Coregonus*, Radulescu & others; parasitising of *Platyopocilus* by *Saprolegniaceae*, Vishinac & Nigrelli; investigation of liver ascites in *Cyprinus*, Amlacher; Trematoda in *Monocirrus*, Geus; parasites of *Acanthocybium solandri*, Iversen & Yoshida; plerocercoid larvae in *Hippoglossus*, Rae.

Mortality.—In a Madurai tank, Krishnamurthi & others; intestinal flukes as cause of mortality, Wales; toxicity of dinoflagellate, *Gymnodinium*, Ray & Wilson; mortality rate of *Engraulis* in Azov Sea, Salnikov; natural mortality rate of *Gadus aeglefinus*, Taylor (1); mortality of *Anguilla* through *Argulus* parasitization, Soika; of *Cyprinodon* from high salinity, Barlow.

Sounds emitted by fishes.—Moulton (2); influencing calling of *Prionotus* with sound, Moulton (1); two different calls made by *Prionotus*, Moulton (3); significance of in *Bathygobius*, Tavolga (3); sounds produced by *Opsanus*, Tavolga (1).

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b. MARINE

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Balistes papuensis Macleay a synonym of *Pseudobalistes flavimarginatus*, Whitley (2); *B. vidua kamoharai* nom. nov. for *B. nycterias* Kamohara (not of Jordan & Evermann), Abe p. 178.

Balistoides conspicillum recorded from Aldabra, Smith, J. L. B. (5).

Hemibalistes chrysoptera, *H. bursa* recorded from Aldabra, Smith, J. L. B. (5).

Melichthys vidua, *M. ringens* recorded from Aldabra, Smith, J. L. B. (5).

Odonus niger recorded from Aldabra, Smith, J. L. B. (5).

Pseudobalistes fuscus, *P. flavimarginatus* recorded from Aldabra, Smith, J. L. B. (5).

Rhinecanthus aculeatus, *R. rectangulus* recorded from Aldabra, Smith, J. L. B. (5).

Sufflamen albicaudatus Mullerian mimicry, Tortonese (3).

MONACANTHIDAE

Correlation between presence of ventral spine and inflatable stomach, Arbocco.

Notes on species from Ceylon, Silva (3).

Amanses scopas, *A. sandwichiensis* from western Indian Ocean, Smith, J. L. B. (5).

Hanomanctus bovinus recorded from Aldabra, Smith, J. L. B. (5).

Laputa cingalensis new record from S. Africa, Smith, J. L. B. (14).

Oxymonacanthus longirostris recorded from Aldabra, Smith, J. L. B. (5).

Paraluteres prionurus recorded from Indian Ocean, Smith, J. L. B. (9).

Paramonacanthus oblongus recorded from Ceylon waters, Silva (3).

Pervagor melanocephalus recorded from Aldabra, Smith, J. L. B. (5).

Stephanolepis cirrifer colour change related to dominance, Okaichi & others.

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Lactoria cornutus, *L. diaphana*, *L. fornasini* recorded from Aldabra, Smith, J. L. B. (9).

Ostracion tuberculatus, *O. lentiginosus* recorded from Aldabra, Smith, J. L. B. (9).

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TETRAODONTIDAE

Arothron key to African species, Smith, J. L. B. (10); *A. hispidus*, *A. stellatus*, *A. nigropunctatus* recorded

from Aldabra, Smith, J. L. B. (9). *A. inconditus* sp. nov. Algoa Bay, Smith, J. L. B. (10) p. 159 figd.; *A. meleagris*, *A. citrinellus* new western Indian Ocean records, Smith, J. L. B. (9).

Canthigaster valentini, *C. bennetti*, *C. margaritatus*, *C. janthinopterus* recorded from Aldabra, Smith, J. L. B. (9).

Carinotetraodon chlupatyi, fig., behaviour, Benl & Chlupaty.

Chelonodontops pulchellus gen. et sp. nov. Xora mouth, Transkei, Smith, J. L. B. (10) p. 156 figd.

Lagocephalus laevigatus recorded from Cedar Key, Florida, Berry (2).

Sphoeroides key to Peruvian species, Morrow (1); *S. andersonianus* sp. nov., Peru, Morrow (1) p. 8 figd.

Tetraodon †lecointrei sp. nov. Neogene W. France, Leriche p. 51 pl. iv figs. 37, 38; *T. leirurus brevirostris* spawning, care of eggs, Geiser; *T. schoutedeni* breeding habits, Merckens; *T. somphongsi*, territorial behaviour, threat display, food, Lüling (1); behaviour in aquarium, Ostermöller (1).

DIODONTIDAE

Key to Ceylon species, Silva (3).

Key to Tasmanian forms, Scott, E. O. G.

Chilomycterus galapagosensis sp. nov. Galapagos Arch., Klausewitz (5) p. 82 figd.; *C. orbicularis* from Ceylon waters, Silva (3).

Diodon cf. *holacanthus* figd., Pliocene Japan, Ozaki; *D. †scillae* figd., Tavani.

†*Kyrtogymnodon* gen. nov. type *Diodon capellinii* De Stefano, Pliocene, Siena, Tavani pp. 180, 190 pl. ii fig. 6.

†*Oligodiodon* gen. nov. type *Diodon acanthodes* Sauvage, Upper Miocene, Sicily pp. 181, 190; *O. a. liburnica* var. nov. p. 190 pl. ii fig. 7; *O. platyodus* figd., Tavani.

†*Progymnodon gigantodus* figd., Tavani.

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Masturus lanceolatus new to Echigo Province, Honma (1).

Ranzania truncata new Moroccan record, Furnestin & others; from Malabar coast, Chacko & Mathew.

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Parvicrepis parvipinnis new W. Australian record, Milward.

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ANTENNARIIDAE

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Histrio structure and release of egg raft, Rasquin (3); *H. histrio* ovarian structure and early embryology, Rasquin (3); new Moroccan record, Furnessin & others; colour change and environment, Breder & Campbell.

Kanazawaichthys scutatus Schultz a prejuvenile of *Antennarius radiosus* Garman, Hubbs, C. L. (3).

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Halieutichthys aculeatus recorded from Venezuela, Martin, S. F. (3).

Malthopsis lutea new S. African record, Smith, J. L. B. (14).

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†*Rhabdoderma* sp. scales figd., Vangerow.

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CORRIGENDUM

Vol. 92 1955 p. 71: under family Cetomimidae in sixth line insert "sp. nov." after *cubiceps*.

